REMEDY SHARED SERVICES
CONCEPT EXPLORATION DOCUMENT

May 2007

Table of Contents

I. Executive Summary

Multiple departments within the State of California are supporting different software products both developed in-house or from a commercial vendor that provides functionality for service desk, change management, problem management, and asset management. The summary will refer to the above functionalities as Information Technology Service Management (ITSM). This document discusses a potential long-term solution that will bring more efficiency and capabilities, as well as cost savings when supporting the above mentioned functionalities.

The Department of Technology Services (DTS) is undertaking an effort to upgrade its existing Remedy applications that support Service Desk, Change Management, Problem Management, and Asset Life Cycle Management. Additionally, the new web-based Remedy Version 7.0 will have a Configuration Management Database capability. One of the features of the new version of Remedy is the ability to share the hardware and software environment between multiple organizations, allowing a socialization of the costs between organizations.

With many departments maintaining and supporting a variety of software programs and tools to support ITSM, there are a number of problems that are occurring. In general, these problems are:

- Outdated and obsolete technology
- Limited functionality
- Complex high-cost infrastructure
- High cost of training, maintenance, and licensing

As a result of these and other such problems, DTS proposes to pursue a service offering solution that will:

- Reduce individual customer department costs by providing a shareable environment
- Provide the latest versions offering greater functionality for different entities
- Provide backup and operational recovery

To accomplish these high-level objectives, DTS proposes to offer a statewide ITSM service offering that will address departmental needs and reduce overall departmental costs. Departments will have the ability to select which ITSM functionality best meets their needs. DTS believes this strategy offers the State with an innovative solution for addressing the current issues with ITSM functionality and providing additional options to the State.

The approach that DTS will implement is to maximize out-of-the-box functionality of the Remedy Version 7.0. This approach allows the potential customers to achieve implementation quicker and will maximize cost savings since maintenance and customization costs will be reduced. Realized cost savings by departments will depend upon multiple factors such as the number of users, type of service, etc. The DTS proposes to submit a completed business plan once the decision to move forward has been decided.

The DTS believes that its proposed approach to ITSM management will bring substantial benefit to the State overall, as well as individual departments as they develop a unified approach to ITSM.

II. Introduction

The Department of Technology Services (DTS) proposes the development of a new service that provides an automated Information Technology Service Management (ITSM) solution for its customers. Based on BMC Remedy's established ITSM application suite, the service would provide Incident and Problem Management, Asset Management, Change Management, and Service Level Management modules on a subscription basis. Customer departments already employing the BMC Remedy tools could seek relief from the burden of maintaining their stand-alone systems including the hiring of scarce administrative resources. Customer departments without the resources and/or expertise to acquire and support automated ITSM solutions would enjoy the cost savings of a shared solution while receiving the benefits associated with the resulting increased maturity of their internal processes. And, by being consistent with the State's move towards consolidation, the service would assist in the standardization of those processes across subscribing departments.

Given that the DTS already owns and maintains its own BMC Remedy ITSM solution, the service costs included in this analysis can be somewhat reduced as DTS would use the same infrastructure. Additionally, the one-time costs listed herein assume the maximum usage level at the instant the service becomes available. In practice, users would likely be added gradually over time, thereby deferring many hardware and licensing costs. Note also that any costs associated with customizing the application programs are not included in this document.

Although the concept may prove to be sound, no financial analysis has been done to determine whether or not the service would be cost effective for our customers. A comprehensive rate analysis, including additional direct and indirect costs, must be completed to produce the data necessary to reach a decision. This analysis document discusses how such a service could be built and suggests that the appropriate resources and priority be invested to complete the analysis.

III. Business Analysis

A. Description of Business Problem or Opportunity

At present, most state agencies and departments independently maintain a number of processes to support information technology (IT) endeavors within their organizations. A subset of these focuses on the internal operation of IT, such as the resolution of service interruptions or management of changes to IT assets. Focused on delivering IT services, these processes are described collectively in the industry as ITSM and include incident management, problem management, change management, configuration management, asset management, and service level management. Though often incomplete, most state entities have addressed these areas within their IT organizations to some degree.

Naturally this has led to the development of a variety of techniques and tools used to implement these processes, including automation. Departments typically start with the implementation of a point solution to automate the help desk function. Some have implemented tools that help manage changes to IT assets, others have not.

Consequently, the State as a whole is burdened with the expense of supporting the same tool suite redundantly. For example, its purchasing power is diluted by the inability to leverage the combined needs of several departments. Also, it must pay redundantly for the infrastructure on which they are deployed.

In addition to cost, such isolated evolution has led to a disparity in the capabilities of these internal processes. Smaller organizations typically lack the resources to develop robust processes and often deploy fragmented solutions that only address a few areas.

In summary, the State continues to suffer the consequences of a decentralized approach to managing essential internal IT processes. The direct cost impacts are readily apparent, given the variety of tools and trained staff, but the indirect costs associated with incomplete and unreliable solutions are also significant.

Several departments, including the DTS, are headed down this path, albeit independently, by their implementation of BMC's Remedy ITSM application suite; other departments use similar product suites to the same end. Recognized as an industry leader, the BMC's efforts in the ITSM market sector have culminated in their recently upgraded product (Version 7.0) that features a true configuration management database at its core. As of this publication date, however, none of the State departments that own Remedy software licenses have upgraded to Version 7.0.

Consequently, they have yet to derive the full potential of the tool and its associated processes it can provide.

Further complicating matters, most of these departments have customized the toolset to the extent that it is no longer compatible with other implementations. Such uniqueness results in an increased maintenance burden requiring Remedy administrator experience not easily recruited from the State workforce.

For all the reasons outlined above, customers of the DTS have requested that the Department consider the viability of building a new service designed to address these concerns. Leveraging its in-house expertise with the tool, the DTS would implement BMC's Remedy ITSM suite on a shared platform and its customers would subscribe to service on a per-seat basis. Its multi-tenancy feature will allow each department to operate independently of each other yet remain on the same BMC Remedy installation.

This consolidated approach offers many benefits which ultimately improve IT services throughout the State. For example, departments with insufficient resources to automate internal processes on their own would now be able to leverage a shared environment at a lower cost. Also, as a result of automating standardized processes on a shared, higher-availability platform, their quality and consistency will be greatly improved and the learning curve for migratory staff will diminish. Finally, subscribers would share the overhead associated with the service including infrastructure, software licensing, and administrative effort.

B. Business Objectives

The following business objectives have been identified for the ITSM Automation service offering:

- Standardize the disparate and varied automation efforts for ITSM processes
- Offer a 'best of breed' Information Technology Infrastructure Library (ITIL) certified solution for subscribing customers
- Deploy the solution on a robust architecture with built in failover capabilities
- Minimize the expense of deploying a solution by replacing isolated systems with a statewide shared system
- Minimize the expense of deploying a solution by spreading the shared costs among all subscribers
- Leverage the State's purchasing power by reducing the number of vendors redundantly supplying solutions to various departments

- Reduce the cost and impact of future upgrades by eliminating the need for individual departmental customizations

C. Customer Adoption Assumption

Conceivably, all state departments are potential customers, but exactly which departments would subscribe to the new service is not known at this time. Further research is required to learn the full extent of potential customer adoption. However, several departments have expressed an interest in subscribing. The Employment Development Department and the Department of Corrections and Rehabilitation are two of the larger departments that maintain significant investments in the BMC Remedy application suite, but lack the trained staff needed to maintain their installations. The Department of Water Resources faces a similar challenge. All have requested that the DTS evaluate the possibility of providing this service.

Other potential subscribing departments that already own BMC Remedy software are listed below. Whether they would elect to subscribe to the service is unknown at this time.

- Department of Alcohol and Drug Programs
- California Department of Corrections and Rehabilitation
- Employment Development Department
- California Department of Health Services
- Office of Systems Integration
- Department of Motor Vehicles
- Department of Water Resources
- California Department of Aging

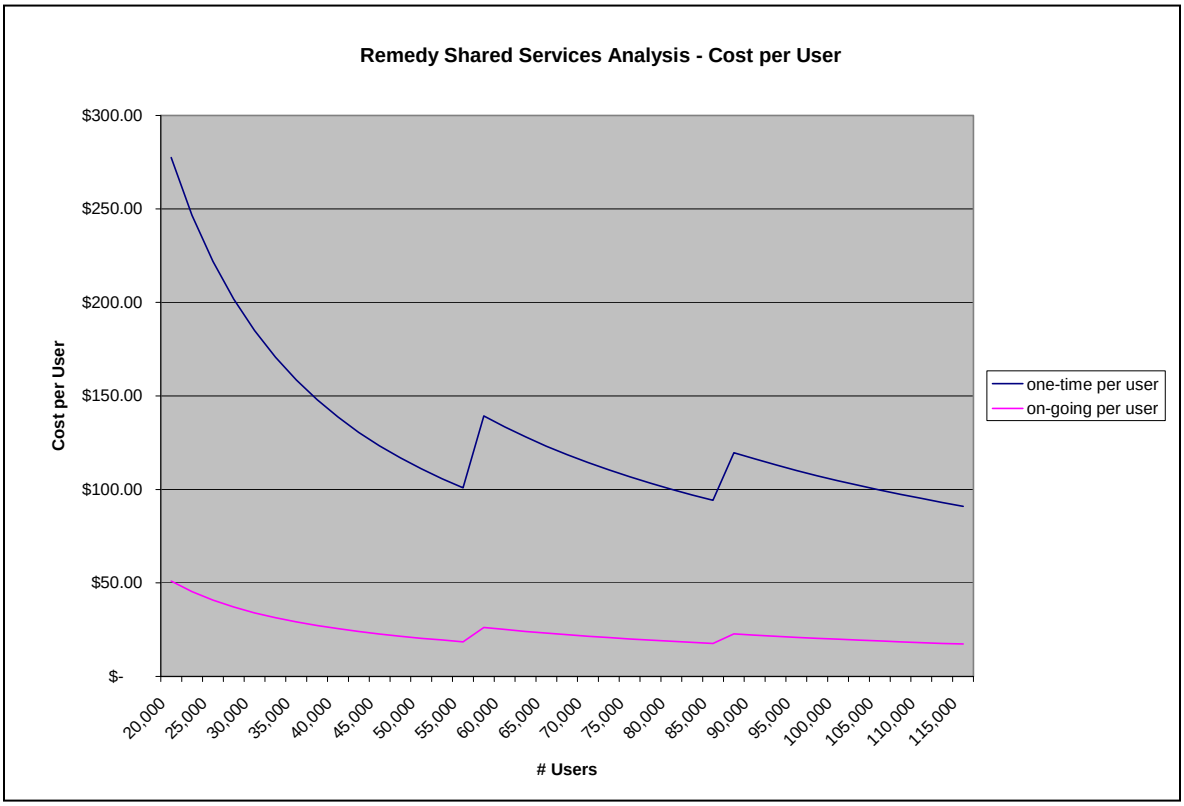
In addition to state departments, other public entities are also potential customers. For example, Ohlone College in Fremont, California, has informally expressed their desire to participate.

D. Customer Value Analysis

Although a comprehensive Cost/Benefit analysis for potential customers is not available at this time, it would be conducted as the next phase of this service analysis.

1. Direct Per User Costs

In summary, this analysis calls for a maximum one-time expenditure of $5,548,601, with an ongoing maintenance commitment of $1,020,644 per year for a fully-licensed implementation serving 56,000 users. The chart below reflects a per-user cost based on these amounts. Again, these figures are preliminary in nature and reflect known direct costs only. In this condition, they are not adequate for deriving any sort of rate structure. Note that although the overall expense for DTS would be lower as the user count approaches 56,000, the per-user cost goes up as the user count decreases[1].



[1] Projections beyond the initial 56,000 user count assume new hardware and software purchases for each additional 28,000 users. For more information, please refer to Section IV, Part A, 3. Life Cycle – Scalability.

IV. Technology Analysis

A. Description of Solution

1. Environment

The software components that comprise the Remedy Shared Services would be installed on equipment located at the DTS Gold Camp Campus. Situated on a raised floor, the equipment would be protected with the regulated environmental controls, fire suppression, and conditioned power that is afforded to all equipment housed at this location.

2. Hardware/Software

Although the exact number of subscribers is not yet known, the DTS proposes a scalable architecture beginning with a base system to support roughly 56,000 customers. Following vendor suggestions, the DTS has identified several software components that would work in concert to support the Remedy Shared Services at this level. Each will contribute specific functionality required to support the application features reliably and efficiently and can be expanded as demand increases.

In anticipation of the 24/7 requirements from the customer, the DTS proposes an architecture that will insure maximum operational uptime. The underlying base design, which includes Dell servers running Microsoft Windows 2003, specifies redundancy throughout. For example, each server would contain two separate power supplies and two separate network interface cards (NICs).

In addition to redundancy, server equipment would be protected by a 24/7 support contract with a four-hour response time from Dell. In this way, the Remedy Shared Services design leverages the best of the Microsoft Windows environment while proactively addressing potential problem areas.

For more detail regarding hardware/software operational recovery, please refer to Section IV, Part D. Operational Recovery.

Network

The Remedy server installation will reside on the existing DTS network and shares its resources along with other applications housed by the Department.

3. Life Cycle

Scalability

It is estimated that as specified, each BMC Remedy Application server can accommodate anywhere from 18,000 to 38,000 users. For the purposes of this discussion, the range will be averaged resulting in a rate of 28,000 users per server. Although the design calls for three (3) BMC Remedy Application servers, one (1) would be held in reserve for redundancy and for processing large batch jobs without impacting end user performance. Therefore, the initial Remedy Shared Services design will accommodate 56,000 users. Should the DTS foresee that the user count would exceed this number, additional application servers could be added to the architecture, each allowing another 28,000 subscribers.

Similarly, the DTS can add additional SQL database cluster and/or mid-tier servers should the need arise. The exact scalability factor is not known at this time.

Future Impacts

The BMC Remedy product is upgraded regularly by the vendor, and major releases are anticipated annually. Note that the expense of completing each upgrade can be reduced considerably by limiting the amount of application customization.

In addition to BMC Remedy upgrades, one would expect the standard regimen of operating system patching for all server and network components.

Lifespan

The life expectancy for server components is four (4) years. There is no corresponding measure for network components; they are retained as long as the vendor continues to support them or until they can no longer meet the design requirements.

B. Maintenance and Operations

Customers of the Remedy Shared Services will report incidents via the existing DTS Incident Management process. The focal point of this process is the DTS Service Desk, which provides a 24/7 single-point-of-

contact for all DTS customers. In summary, customers can utilize a variety a methods to convey their concerns to the Service Desk; the Service Desk then makes every effort to restore service or coordinates involvement of the appropriate subject matter experts to do the same. All incidents are tracked, prioritized, and escalated, as appropriate.

In addition to incident resolution, the DTS Incident Management process also includes event monitoring. This second-level support function is performed by the Network Support team and includes monitoring a variety of tools for server and/or network incidents. Ideally, DTS staff performing this role identify and repair incidents before the customer experiences any interruptions in service.

As with the Incident Management, the Remedy Shared Services will utilize the existing DTS Problem Management process. In summary, the process includes a bi-weekly meeting where candidate 'problem' issues are considered for further research. Selected issues are then documented in a Service Outage Analysis report which captures the problem, its impact, root cause, workaround, and long term resolution. In this way, future incidents can be proactively prevented.

At this time, the DTS does not have a formally documented, overarching Capacity Planning process. Instead, each area of expertise (e.g., network, server, database, etc.) performs its own capacity planning and the same is anticipated for elements of the Remedy Shared Services.

C. Security

The Remedy Shared Services equipment will be housed on the raised floor of the DTS Gold Camp Campus computer room. Entrance to the computer room is limited to authorized personnel only and is regulated by key card access. Entrance to the DTS Gold Camp Campus is limited to DTS staff and authorized visitors; it is regulated by security staff and photo ID access.

Access to the Remedy Shared Services infrastructure will be protected on many fronts. First, most servers will be positioned completely behind firewalls to prevent access via the internet. A few servers, such as those used for BMC Remedy mid-tier, will be situated within a DMZ which restricts access via the Internet.

Password protection will also be featured throughout the implementation. All servers and network components will be password protected at the operating system level; this restricts administrator access to the staff responsible for maintaining them. Similarly, software components will be password protected at both the application user and administrator levels;

this will restrict application access to the staff assigned the appropriate support role.

Changes to the infrastructure will be managed using the DTS Change Management process. Checks and balances afforded by the process ensure that only authorized changes will be made to the production environment, and only by authorized staff.

Security Risks

Unauthorized access of the Remedy Shared Services data is highly unlikely due to the controls designed into the system. If this type of access were it to occur, however, the impact would vary greatly depending upon the content of the particular information that was accessed and what the intruder might do with that knowledge. For example, data for some customers, such as Department of Health Services, may have Health Insurance Portability and Accountability Act (HIPAA) implications. Passwords at the client and administrator level, plus the overall application design, ensure that this does not happen.

On the other hand, unauthorized access at the server and/or application level could be potentially devastating. Though highly unlikely, the potential impacts could range from mischievous tampering to crashing the service. This risk would be mitigated by password protections, network controls including firewalls, and data storage on distinct servers. In addition, security staff would routinely examine the implementation by scanning for vulnerabilities.

Malicious attacks from the Internet against the Remedy Shared Services assets are mitigated by the network firewalls.

D. Operational Recovery

Backup and Archival

The DTS will implement a robust backup strategy for the database servers involving features available in the Microsoft SQL Server tool. The remaining servers will be backed up on a periodic basis, but not with the same frequency due to their fairly static nature.

Backup tapes would be stored off-site on a weekly, rotating basis.

The BMC Remedy server product features an archival tool to store outdated information offline. Its specific implementation would be ascertained during the design phase of service development.

Recovery Objectives

At this time, it is not known what detailed requirements would exist for service recovery. At a minimum, staff would make a best-effort attempt to restore services following a disaster as soon as possible, utilizing the backup tapes mentioned previously. More reliable solutions are available at additional expense, ranging from redundant equipment housed at an alternate DTS location to a fully-equipped 'hot-site' designed to accommodate both the server or network demands of the service.

A more cost effective approach would involve locating clustered production equipment at an alternate DTS location. For example, housing one of the three suggested BMC Remedy application servers and several of the database servers away from the Gold Camp facility would provide failover capability with little or no recovery time. Although the single server would be unable to accommodate the production capacity of 56,000 users, by design it could support a smaller, pre-prioritized user count of 28,000. This would provide customers the assurance that they could continue utilizing the full functionality of the service in the event of a disaster, albeit at a lower capacity, while avoiding the cost of duplicating the entire infrastructure.

Note that none of these alternatives are included in the cost breakdown, but will be included in the next phase of this analysis. DTS will evaluate the need for disaster recovery and look at several options, including build and recover, as well as instantaneous failover.

E. Operational Risk

Risk Identification

Availability

The most significant risk for the Remedy Shared Services will be availability. Should the service become unavailable, customers would not be able to reliably access their internal process data and, quite possibly, could impact their operations. Actual consequences of this will vary depending upon customer usage, but it is apparent that the effects could be far reaching.

Security

Please refer to Section IV, Part C. Security, of this document for more information regarding security risks and their mitigation measures.

Risk Mitigation

Event Monitoring

The DTS has deployed various monitoring technologies for the identification and reporting of availability events to staff. These tools continuously monitor the health of the servers and network components and report any exceptions that require staff involvement. In addition, staff proactively monitors equipment for potential capacity issues. Assets of the Remedy Shared Services would be monitored in a similar fashion

Redundancy

To maximize the availability of the Remedy Shared Services, the proposed design includes redundancy at many points. Both network and server components would be duplicated, where necessary, so that a backup system would be available should the primary system go down. For example, the servers that support the following functions would be configured with redundancy:

- BMC Remedy Action Request System Core
- BMC Remedy ITSM Applications
- Remote Access

In addition to server redundancy by function, the servers themselves would be configured with redundant power supplies and NICs. The power supplies would be connected to different power sources so that power issues would not affect the service. Each NIC would be connected to a separate switch providing each server with a primary and secondary route for connectivity.

Cluster

The Remedy Shared Services database would be housed on an SQL server cluster. This grouping of active and passive servers would provide more availability than server redundancy. Server status can be continuously monitored and, should any of the group fail, the servers held in reserve would automatically assume their duties. Designating some servers as reserves will provide an additional buffer while staff repairs servers that have failed or are offline.

Administration

Groups of DTS staff would be dedicated to the support and maintenance of the network and server components that make up the Remedy Shared Services. These administrators will ensure that the systems are operating optimally by reviewing current product information, applying the latest patches, and staying abreast of developments in the areas they support.

The DTS makes every effort to provide the appropriate level of training for existing staff and to hire the most qualified staff and consultants available. Developing and supporting the Remedy Shared Services would be no different.

Server Support

The Remedy Shared Services server environment would be comprised of Dell equipment which would be covered by Dell Gold Support, including a 24/7, four-hour response from the vendor. Windows staff would report problems via an 800 number to Dell who would then work to resolve the reported problem.

Security

Please refer to Section IV, Part C. Security, of this document for a discussion of security risks and their mitigation measures.

Operating Level Agreements

At this time, operating level agreements have not been developed for the proposed service. It is anticipated, due to the nature of these services, that this service will have a 24/7 requirement. This will be verified and/or modified during the next phase of the service analysis.

V. Outstanding Issues

A. Business Analysis

The basis for the Remedy Shared Services is customer demand, but as of this writing, this has not been quantified. Should the analysis continue, a survey of potential customers would be paramount. Specifically, the DTS needs to learn:

- How many customers would elect to participate?
- How many licenses those customers would require (e.g., ratio of IT staff to non-IT staff)?
- Which applications would those customers require and to what extent?

The implications of existing BMC Remedy licenses must also be explored. Customers with such licenses will be expecting some sort of discount in exchange for the lower one-time costs associated with bringing them on board. It may become necessary to negotiate exchanges with the vendor to minimize the number of licenses rendered obsolete as a consequence.

Ironically, this may include the DTS itself. All costs included in this analysis assume that the DTS would remain on its own, separate BMC Remedy implementation. Should the DTS elect to contribute its existing BMC Remedy resources, the number of servers and licenses would be reduced. However, the number of user licenses would not.

B. Technology Analysis

The preliminary design presented in this document must be thoroughly vetted by technical staff to insure its accuracy and completeness. Of particular concern is the potential impact to existing DTS network resources and what might be required to accommodate the demands of the Remedy Shared Services usage.

Also of significance are the projected data needs of the Remedy Shared Services. The scalability factor of the SQL database server(s) is not yet known and would impact the infrastructure needs of the service.

At the heart of BMC Remedy Version 7.0, is the configuration management database (CMDB). Since it will contain customer configuration items and relationships, the processing demands and storage needs of this feature are not yet known. More research is required to determine how the unique nature of each customer's infrastructure will impact the CMDB feature.

Although it does feature high-availability characteristics, the design presented in this analysis does not account for any specific Operational Recovery technique. Further analysis will explore various alternatives and evaluate them considering availability, recovery time, and expense. It is possible that the selected alternative may call for building a redundant infrastructure at an alternate location. If so, note that the associated costs are *not* included in this analysis.[2]

Prior to offering this service to its customers, the DTS must prepare a Service Level Agreement (SLA) for the Remedy Shared Services. This will require the preparation of the underlying Operating Level Agreements (OLA) to insure we can meet customer expectations. The expense associated with developing and maintaining these is *not* included in this analysis.

C. Financial Analysis

The basis for a sound decision, as to whether or not to develop the Remedy Shared Services, must include a detailed financial analysis. At this time, the DTS has not conducted this analysis for the Remedy Shared Services. Therefore, this document includes only the most significant direct costs such as hardware and software licenses. Should the decision be made to pursue the Remedy Shared Services further, a more detailed financial analysis will be undertaken.

A complete financial analysis for the Remedy Shared Services would include consideration for other direct costs such as labor expense for both Windows Server and Remedy administration. In addition, the possibility exists that existing DTS network resources may not have the capacity to accommodate the new service; additional network hardware expenses might be incurred to that end. It is also extremely likely that customers will require training on the new product suite; and, these training needs and resources are not covered in this document.

Indirect costs would also be included in the financial analysis. For example, all services must recover a portion of DTS overhead expenses. Indirect costs would also include amounts to recover shared network costs.

The BMC Remedy application platform features the ability to modify its program components at the source code level. Though often desirable, considerable customizations add to the administrative expense of ongoing

[2] Note that disaster recovery options are not described in detail in this document. Further analysis, as described in Section IV, Part D. Recovery Objectives, will occur during the next phase of this effort.

maintenance and complicate future upgrades. In addition, significant deviations from the 'out of the box' applications would render the BMC web based training products unusable. Any short-term and long-term costs associated with customization would be in addition to the figures presented in this analysis.

Note also that the discount percentage offered by BMC Remedy and its resellers may be lower based on volume purchases. For the purposes of this exercise, the list price multiplier is set at 75 percent.